National Aeronautics and Space Administration

Antarctic Meteorite Newsletter

Volume 29, Number 1 February 2006

Curator's Comments

Kevin Righter
NASA-JSC

New Meteorites

This newsletter contains classifications for 597 new meteorites from the 2003 and 2004 ANSMET seasons. They include samples from the Cumulus Hills, Dominion Range, Grosvenor Mountains, LaPaz Icefield, MacAlpine Hills, and the Miller Range. Macroscopic and petrographic descriptions are given for 25 of the new meteorites: 1 acapulcoite/lodranite, 1 howardite, 1 diogenite, 2 eucrites, 1 enstatite chondrite, four L3 and two H3 chondrites, 2 CM, 3 CK and 1 CV chondrites, three R chondrites, and four impact melt breccias (with affinities for H and L). Likely the most interesting sample announced in this newsletter is LAP04840, with affinity to R chondrites. This meteorite contains approximately 15% hornblende, and has mineral compositional ranges and oxygen isotopic values similar to those of R chondrites. The presence of an apparently hydrous phase in this petrologic grade 6 chondrite is very unusual, and should be of great interest to many meteoriticists.

New Website

The curator's website has a new look, and has also been updated and improved:

http://curator.jsc.nasa.gov/

The new website allows one to search the meteorite database by sample number, year, classification, weathering degree, or fracturing degree. There have also been more photos added to the website for certain samples, and additional photos are being added on a regular basis.

Reminder about Ungrouped Samples

The Meteorite Working Group has suggested that we remind the community about samples in the collection that remain ungrouped and unusual. There are several: MAC 87300/301 and LEW 85332 are ungrouped carbonaceous chondrites, QUE 94200 and its pairs (QUE 97289 and QUE 97348 and QUE 99059, QUE 99122, QUE 99157, QUE 99158, QUE 99387) are ungrouped enstatite chondrites, GRO 95551 is a metal-rich ungrouped chondrite, and LEW 88763 and QUE 93148 are ungrouped achondrites.

continued on p.2

A periodical issued by the Meteorite Working Group to inform scientists of the basic characteristics of specimens recovered in the Antarctic.

Edited by Cecilia Satterwhite and Kevin Righter, NASA Johnson Space Center, Houston, Texas 77058

Inside this Issue

Sample Request Deadline
March 3, 2006

MWG Meets
March 17-18, 2006

Free publication available at: **http://curator.jsc.nasa.gov/antmet/amn/amn.cfm**

Terrestrial Samples

There are a number of terrestrial samples collected from the Elephant Moraine region of Antarctica. These samples (given the numbers EET 96400 and 401, Dolerites) have been stored in the large sample cabinet under dry nitrogen at JSC since 1997. Although we would like to remove them from the processing facility, we thought we would ask to see if anyone wishes to study these samples. If you are interested, please get in touch with us as soon as possible. If we don't hear anything by the time of the next newsletter (September 2006), we will remove them from the cabinet.

Terrestrial Age Survey

Kuni Nishiizumi has provided a summary of his ^{36}Cl measurements of terrestrial ages for a large number of Antarctic meteorites from our collections – they are included in this newsletter after Ralph Harvey's report of the 2005-2006 ANSMET field season.

'03 Season Meteorites Thawed Accidentally

On December 5, we made the unfortunate discovery that the freezer in the main Meteorite Processing Lab (MPL) room had lost power, was essentially at room temperature inside, and the samples within had thawed in their bags. Samples are usually thawed in dry nitrogen to minimize reaction and oxidation. After some investigation into this discovery, we realized that due to construction in Building 31, the power to that freezer had been off since Nov. 11, nearly three weeks. This unfortunate circumstance was dealt with immediately. We moved all samples in the freezer into drying cabinets, and cut the bags to immediately begin the drying process. All 530 samples affected were from the 2003 collection. We have tagged all of these samples in the database as "thawed"; these samples are indicated in the list of meteorites announced in this newsletter. Although most of the samples do not show any effects of being thawed, approximately 1% have more extensive evaporitic growth (sulfates). A full account of the effects on samples will be provided in a future newsletter. The main purpose of this message is to warn those of you who may be interested in doing studies related to low temperature or surface mineralogy.

News from the Smithsonian

Tim McCoy, Curator of Meteorite Collection
U.S. National Museum of Natural History

This newsletter reports classification of almost 600 meteorites and while you might only find a few of these of interest for your research, sorting through all of the equilibrated ordinary chondrites comprises the majority of our work load. In the last 6 months, most of that work was accomplished by long-time Smithsonian meteorite collection manager Linda Welzenbach and Allie Gale. Allie is a name that will be less familiar to you. She has been working for us full-time since graduating from the Univ. of Maryland last summer. She'll be off to graduate school before the next newsletter, but she's helped carry much of the load while I've been off working on Mars (or at least on the Mars rovers).

By late summer, we will have a new collections technician joining us at the Smithsonian in a position to be shared between the meteorite and rock & ore collections. He or she will spend much of his/her time working with Antarctic meteorites, particularly handling all of the samples being transferred to us from JSC. With a little luck, we might even be able to make an introduction to the community in the next newsletter. Stay tuned!

Report on the 2005-2006 Field Season

Ralph Harvey, Principal Investigator
Antarctic Search for Meteorites (ANSMET) Program

The 2005-2006 ANSMET field season went like clockwork but was a lean one for meteorites - only 171 for the systematic searching team in the Miller Range and 67 for the reconnaissance group exploring several blue ice patches south

2005-2006 ANSMET field teams:
Front row (left to right):Shaun Norman, Joe Boesenberg, Jani Radebaugh
Middle row: Mike Wyatt, Mary Sue Bell, Ralph Harvey, Graciela Matrajt, Mike Kelley, Marie Keiding
Rear: John Schutt, Mike Rampey, Gordon (Oz) Osinski
Inset: Ben Bussey

of the Allan Hills region and west of the Dry Valleys. The problem for the Miller Range group was weather. A wind storm was raging when the team arrived at their new home and it continued for 6 days, narrowly avoiding an ANSMET record. After that it was calm, but then it began to snow, and before long the meteorites were buried, as were the team's hope of finding them. The team stayed busy with detailed reconnaissance and secondary science in support of future seasons; but in the end, only a bit more than a week had been spent systematic searching.

The reconnaissance team also had to deal with strange weather and too much snow, but they got more wind, and moving around let them pick their targets. Unfortunately, they simply didn't have many meteorites to find. This wasn't entirely a surprise- many of the target icefields had been examined by helicopter in the first year of ANSMET and yielded no meteorites at the time. But with modern satellite imagery and search techniques, and a few recent serendipitous finds to guide us, we felt a need for a modern ground-based search of some icefields that had been visited only briefly or not at all. The team examined a lot of promising blue ice, and managed to find a couple of small concentrations, but no major new concentrations were found.

In a nutshell, it was a year marked by odd weather and low recovery numbers. While it certainly wasn't our plan to recover only a fifth of the typical haul of recent years, we worked hard and dealt with the conditions as best we could. I'm sure there are a few rocks in the 05 collection that will interest you. Certainly we're happy to let the curators at JSC and the Smithsonian catch their breath just a bit after several seasons of 1200+ recoveries.

The reconnaissance team's DeWitt camp in the Taylor Valley region, their third camp of the season.

Terrestrial Age Survey of Antarctic Meteorites

Kuni Nishiizumi, Principal Investigator
Univ. of California, Berkeley

We have started a terrestrial ages survey of Antarctic meteorites, based on the concentration of cosmogenic ^{36}Cl (half-life = 3.01×10^5 yr) in the metal fraction. After separation of clean metal and chemical separation of Cl at the Space Sciences Laboratory, University of California, Berkeley, the ^{36}Cl concentrations were measured by accelerator mass spectrometry (AMS) at PRIME Lab, Purdue University (mcaffee@physics.purdue.edu). Table 1 shows the first results of ^{36}Cl concentrations and terrestrial ages in 100 Antarctic meteorites. Since the ^{36}Cl saturation values in the metal phase of small to medium-sized meteorites are in a relatively narrow range of 19-25 dpm/kg (2s), the measured ^{36}Cl concentrations yield a direct measure of the terrestrial age (Nishiizumi et al. 1989). The apparent terrestrial age, T(terr), (in kyr) can be calculated using the following equation:

$$T(terr) = -434 \times \ln(A/A_0)$$

where A is the measured ^{36}Cl concentration and A_0 is the average ^{36}Cl saturation value of 22.1±2.8 dpm/kg-metal (2s) (Nishiizumi 1995). For meteorites with ^{36}Cl concentrations >22.1 dpm/kg we only report an upper limit of the terrestrial age, whereas for meteorites with ^{36}Cl concentrations between 19.5 and 22.1 dpm/kg, we report the possible range of terrestrial ages in Table 1. For meteorites with ^{36}Cl concentrations <19 dpm/kg there is a small possibility that these low values are due to unusually high shielding conditions or a short exposure age, but this can only be verified by measuring additional cosmogenic nuclides.

For more information about the ^{36}Cl results, or the terrestrial ages, please contact Kuni Nishiizumi (kuni@ssl.berkeley.edu) or Kees Welten (kcwelten@berkeley.edu). This work was supported by NSF-OPP and NASA's Cosmochemistry Program.

References

Nishiizumi K., Elmore D. and Kubik P. W. (1989) Update on terrestrial ages of Antarctic meteorites Earth Planet. Sci. Lett. 93, 299-313.

Nishiizumi K. 1995. Terrestrial ages of meteorites from cold and cold regions. In Workshop on meteorites from cold and hot deserts. (eds. L. Schultz, J. O. Annexstad and M. E. Zolensky) pp. 53-55. LPI Technical Report No. 95-02, Lunar and Planetary Institute, Houston, Texas.

Table 1 - Measured ^{36}Cl concentrations (in dpm/kg-metal) and ^{36}Cl-derived terrestrial ages (in kyr) of Antarctic meteorites

Meteorite	Type	^{36}Cl	T(terr)		Meteorite	Type	^{36}Cl	T(terr)
ALHA 77155	L6	14.0±0.3	200±60		EET 92039	L6	23.0±0.6	<39
ALHA 78047	H5	5.1±0.2	640±60		EET 92040	H5	22.3±0.5	<52
ALHA 78106	L6	9.8±0.3	350±60		EET 92047	H5	22.6±0.9	<48
ALHA 79002	H6	17.2±0.8	110±60		EET 92053	LL6	21.2±0.6	37±37
ALHA 81017	L6	14.2±0.3	190±60		EET 92061	L5	21.1±0.5	38±38
ALHA 81031	L3.4	16.6±0.7	120±60		EET 96023	H6	22.8±0.5	<43
ALHA 81111	H6	18.7±0.5	72±56		EET 96024	L6	20.1±0.5	49±49
ALHA 81119	L4	12.6±0.3	240±60		EET 96035	L4	22.3±0.3	<52
ALH 83007	LL3.2/3.5	20.2±0.4	47±47		EET 96036	L6	20.2±0.7	48±48
ALH 84069	H5	23.7±0.7	<26		EET 96041	H6	14.6±0.4	180±60
ALH 84077	H5	21.3±0.6	36±36		EET 96043	H5	21.2±0.8	37±37
ALH 84082	H6	19.4±0.5	57±56		EET 96048	L6	20.7±0.5	30
ALH 84103	H4	8.4±0.2	420±60		EET 96049	LL6	14.6±0.3	180±60
ALH 84164	L6	7.9±0.3	440±60		EET 96055	H5	17.5±0.8	100±60
ALH 85024	H5	23.0±0.7	<40		EET 99401	H5	23.8±0.7	<23
ALH 85031	H6	24.0±0.5	<21		EET 99404	H4	23.8±1.0	<26
ALH 85041	H6	8.6±0.3	410±60		EET 99405	L5	22.2±0.5	<53
ALH 85044	H6	8.5±0.2	420±60		EET 99414	H5	22.6±0.8	<48
ALH 85076	L6	13.8±0.7	210±60		EET 99420	H5	13.6±0.4	210±60
ALH 86600	L6	13.3±0.5	220±60		FIN 00101	H4	22.7±1.2	<48
ALH 90401	LL6	18.0±0.5	89±56		FIN 01601	L6	21.9±0.7	31±31
BTN 00304	LL6	24.0±0.8	<22		GEO 99103	H4/6	19.9±2.0	58±58
BTN 00305	L5	24.1±0.4	<18		GEO 99108	L5	24.6±0.9	<11
BTN 00307	L6	22.9±0.6	<41		GRA 95215	H4	20.5±0.4	44±44
DOM 85504	L4	22.7±0.5	<45		GRA 98001	H5	20.8±0.5	41±41
DOM 85505	LL5	24.7±1.0	<10		GRA 98186	H6	18.2±0.7	83±58
DOM 85509	L6	23.1±0.7	<37		GRO 95515	L4	16.4±0.6	130±60
EET 82601	L3.5/3.7	19.7±0.6	53±53		GRO 95520	H5	19.0±0.4	66±56
EET 82608	LL6	16.9±0.5	120±60		GRO 95523	L6	22.3±0.6	<52
EET 83207	H4	23.7±0.6	<25		GRO 95524	H5	22.7±0.9	<46
EET 83213	LL3.7	13.9±0.5	200±60		GRO 95525	H6	20.9±0.3	40±40
EET 83237	L6	20.0±0.5	49±49		GRO 95527	H4	19.5±0.4	55±55
EET 83238	L6	23.2±0.9	<37		LEW 86023	L6	23.6±0.5	<27
EET 83244	L6	11.6±0.3	280±60		LEW 86085	L6	12.6±0.6	250±60
EET 83315	L6	22.6±0.4	<46		LEW 86534	H5	21.5±0.5	34±34
EET 83399	L3.3/3.6	19.9±0.3	51±51		LEW 87006	MES	23.6±0.8	<29
EET 87536	L6	17.4±0.6	100±60		MAC 87302	L4	23.0±0.8	<39
EET 87555	L6	18.7±0.8	72±58		MAC 87305	L4	18.5±0.6	78±57
EET 87558	L5	23.2±0.5	<35		MAC 87315	H6	14.6±1.5	180±70
EET 87671	L6	19.6±0.7	55±55		MAC 88110	H6	13.2±0.3	220±60
EET 87724	L6	19.5±0.6	55±55		MAC 88122	H5	18.9±0.7	68±57
EET 87778	H3.9	22.0±0.5	29±29		MIL 99305	L6	19.8±0.6	52±52
EET 87806	LL6	22.0±0.5	28±28		MIL 99306	L5	20.4±0.8	46±46
EET 90178	H5	22.5±0.5	<47		PAT 91506	L6	22.9±0.8	<42
EET 90237	H5	23.7±0.8	<26		PCA 91031	H6	22.4±1.6	<57
EET 90246	H6	22.8±1.1	<45		PCA 91034	H6	19.8±0.7	53±53
EET 90372	H5	21.2±0.9	38±38		PCA 91035	L6	24.4±1.3	<17
EET 90488	L6	24.4±0.9	<15		RKP 86702	L6	20.7±0.4	42±42
EET 90495	L4	23.2±1.0	<36		SCO 98200	L4	22.7±0.9	<45
EET 90727	L6	20.5±0.8	45±45		SCO 98201	L6	21.3±0.9	37±37

New Meteorites

2003-2004 Collection

Pages 6-25 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 28 (2), Aug. 2005. Specimens of special petrologic type (carbonaceous chondrite, unequilibrated ordinary chondrite, achondrite, etc.) are represented by separate descriptions unless they are paired with previously described meteorites. However, some specimens of non-special petrologic type are listed only as single line entries in Table 1. For convenience, new specimens of special petrological type are also recast in Table 2.

Macroscopic descriptions of stony meteorites were performed at NASA/JSC. These descriptions summarize hand-specimen features observed during inital examination. Classification is based on microscopic petrography and reconnaissance-level electron microprobe analyses using polished sections prepared from a small chip of each meteorite. For each stony meteorite the sample number assigned to the preliminary examination section is included. In some cases, however, a single microscopic description was based on thin sections of several specimens believed to be members of a single fall.

Meteorite descriptions contained in this issue were contributed by the following individuals:

Kathleen McBride, Cecilia Satterwhite
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Tim McCoy, Linda Welzenbach,
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U.S. National Museum of Natural History
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Antarctic Meteorite Locations

ALH — Allan Hills
BEC — Beckett Nunatak
BOW — Bowden Neve
BTN — Bates Nunataks
CMS — Cumulus Hills
CRE — Mt. Crean
DAV — David Glacier
DEW — Mt. DeWitt
DOM — Dominion Range
DRP — Derrick Peak
EET — Elephant Moraine
FIN — Finger Ridge
GDR — Gardner Ridge
GEO — Geologists Range
GRA — Graves Nunataks
GRO — Grosvenor Mountains
HOW — Mt. Howe
ILD — Inland Forts
KLE — Klein Ice Field
LAP — LaPaz Ice Field
LAR — Larkman Nunatak
LEW — Lewis Cliff
LON — Lonewolf Nunataks
MAC — MacAlpine Hills
MBR — Mount Baldr
MCY — MacKay Glacier
MET — Meteorite Hills
MIL — Miller Range
ODE — Odell Glacier
OTT — Outpost Nunatak
PAT — Patuxent Range
PCA — Pecora Escarpment
PGP — Purgatory Peak
PRA — Mt. Pratt
PRE — Mt. Prestrud
QUE — Queen Alexandra Range
RBT — Roberts Massif
RKP — Reckling Peak
SAN — Sandford Cliffs
SCO — Scott Glacier
STE — Stewart Hills
TEN — Tentacle Ridge
TIL — Thiel Mountains
TYR — Taylor Glacier
WIS — Wisconsin Range
WSG — Mt. Wisting

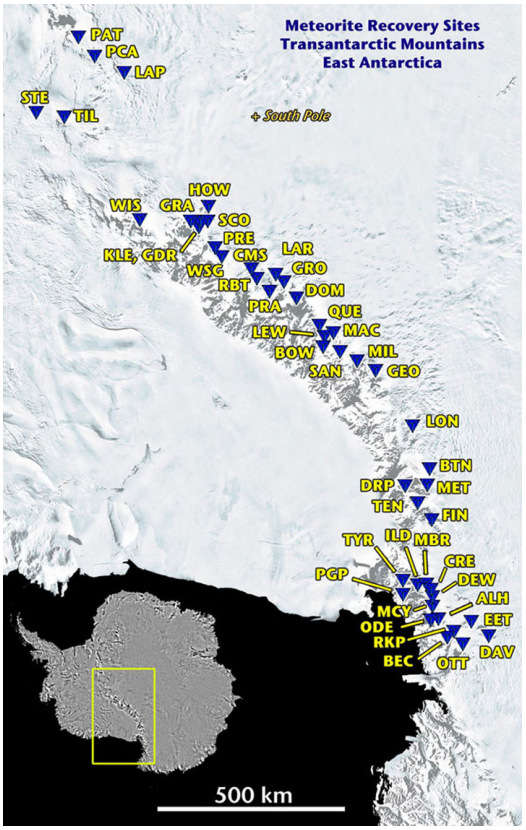

Table 1
List of Newly Classified Antarctic Meteorites **

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 03181		5363.9	L3 CHONDRITE	B/C	A/B	1-37	1-5
DOM 03318	~	2964.7	H5 CHONDRITE	B/CE	A/B		
DOM 03319	~	3449.7	L5 CHONDRITE	B/C	A/B		
DOM 03320	~	2176.7	L5 CHONDRITE	B/C	B/C		
GRO 03007	~	3850.0	L5 CHONDRITE	CE	B/C		
GRO 03013	~	1035.0	L5 CHONDRITE	C	C		
GRO 03014	~	1110.0	L5 CHONDRITE	C	C		
GRO 03015		480.0	L3 CHONDRITE	BE	A	1-29	3-29
GRO 03016	~	955.0	L5 CHONDRITE	CE	C		
GRO 03017	~	310.0	LL5 CHONDRITE	BE	B/C		
GRO 03019	~	1243.0	L5 CHONDRITE	C	C		
GRO 03020	~	555.0	L5 CHONDRITE	C	C		
GRO 03021	~t	607.9	L5 CHONDRITE	B/C	B		
GRO 03022	~t	653.5	H5 CHONDRITE	B/C	B		
GRO 03023	~t	882.0	L5 CHONDRITE	B/C	B		
GRO 03024	~t	642.7	L5 CHONDRITE	B/CE	B/CE		
GRO 03025	~	595.0	L5 CHONDRITE	C	C		
GRO 03027	~	585.0	L5 CHONDRITE	C	C		
GRO 03028	~	475.0	L5 CHONDRITE	C	C		
GRO 03029	~t	520.2	L5 CHONDRITE	B/CE	B		
GRO 03031	~t	772.8	L5 CHONDRITE	B/C	A/B		
GRO 03032	~t	389.1	H5 CHONDRITE	B/C	A		
GRO 03033	~t	334.1	L5 CHONDRITE	B/C	A/B		
GRO 03035	~t	358.4	L5 CHONDRITE	B/C	B		
GRO 03036	~t	338.7	L5 CHONDRITE	B/C	B		
GRO 03037	~t	532.1	L5 CHONDRITE	B	B		
GRO 03038	~t	391.9	L5 CHONDRITE	B/C	B		
GRO 03039	~t	386.9	L5 CHONDRITE	B/CE	B		
GRO 03050	~	275.0	L5 CHONDRITE	C	C		
GRO 03051	~	182.0	H5 CHONDRITE	C	C		
GRO 03052	~	295.0	LL5 CHONDRITE	B	A/B		
GRO 03053	~	280.0	H5 CHONDRITE	C	A/B		
GRO 03054	~	340.0	LL5 CHONDRITE	B	B/C		
GRO 03060	~	520.0	L5 CHONDRITE	C	B		
GRO 03061		455.0	L3 CHONDRITE	B	A/B	1-29	3-21
GRO 03062	~	440.0	L5 CHONDRITE	C	C		
GRO 03063	~	245.0	L4 CHONDRITE	A/B	A/B		
GRO 03070	~t	353.0	LL5 CHONDRITE	A/B	A/B		
GRO 03071	~t	261.9	L5 CHONDRITE	B/C	A/B		
GRO 03072	~t	158.6	L5 CHONDRITE	B/C	A/B		
GRO 03073	~t	146.3	L5 CHONDRITE	B/C	A/B		
GRO 03074	~t	268.5	LL5 CHONDRITE	A/B	B		
GRO 03080	~t	177.7	L5 CHONDRITE	B/C	A/B		
GRO 03081	~t	212.2	L5 CHONDRITE	B/C	A/B		
GRO 03082	~t	174.5	L5 CHONDRITE	B/C	A/B		
GRO 03083	~t	131.4	LL5 CHONDRITE	B/C	A/B		
GRO 03084	~t	184.7	L4 CHONDRITE	B	A		
GRO 03085	~t	155.1	LL5 CHONDRITE	A/B	A/B		

~Classified by using refractive indices.
t - samples thawed in MPL (see curator's comments for explanation).

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
GRO 03086	t	131.7	H4 CHONDRITE	A/B	A	20	7-17
GRO 03087	~t	135.8	L4 CHONDRITE	B/C	A		
GRO 03088	~t	139.4	L5 CHONDRITE	B	A		
GRO 03089	~t	189.5	H5 CHONDRITE	B/C	A		
GRO 03090	~t	177.6	L5 CHONDRITE	B/C	A/B		
GRO 03091	~t	238.6	L5 CHONDRITE	B/C	A/B		
GRO 03092	~t	139.2	L5 CHONDRITE	B/C	A/B		
GRO 03093	~t	183.7	L5 CHONDRITE	B/C	A/B		
GRO 03094	~t	128.0	LL5 CHONDRITE	B/C	A/B		
GRO 03095	~	140.3	H6 CHONDRITE	C	B		
GRO 03096	~	135.9	L5 CHONDRITE	C	B/C		
GRO 03097	~	123.0	L5 CHONDRITE	C	B/C		
GRO 03098	~	117.1	L5 CHONDRITE	C	B/C		
GRO 03099	~	245.1	H5 CHONDRITE	C	B		
GRO 03100	~t	91.6	L5 CHONDRITE	B/C	B		
GRO 03101	~t	95.2	L5 CHONDRITE	B/C	A/B		
GRO 03102	~t	113.8	L5 CHONDRITE	B/C	A/B		
GRO 03103	~t	207.6	H5 CHONDRITE	B/CE	A		
GRO 03104	~t	142.2	H5 CHONDRITE	B/CE	A/B		
GRO 03105	~	122.7	LL6 CHONDRITE	C	B		
GRO 03106	~	142.4	L5 CHONDRITE	C	C		
GRO 03107	~	73.8	LL6 CHONDRITE	C	B		
GRO 03108	~	61.0	L4 CHONDRITE	B	B		
GRO 03109	~	78.6	L5 CHONDRITE	C	C		
GRO 03111	~	88.0	L5 CHONDRITE	B/C	A/B		
GRO 03112	~	103.2	L5 CHONDRITE	B/C	A/B		
GRO 03113	~	100.9	LL5 CHONDRITE	C	A/B		
GRO 03114	~	93.0	H5 CHONDRITE	C	B		
GRO 03120	~	102.7	H5 CHONDRITE	B/C	A		
GRO 03121	~	82.9	H5 CHONDRITE	B/C	A/B		
GRO 03122	~	48.9	L5 CHONDRITE	B/C	A/B		
GRO 03123	~	86.3	L5 CHONDRITE	B/C	A/B		
GRO 03124	~	84.1	L5 CHONDRITE	A/B	A		
GRO 03125	~	69.6	L5 CHONDRITE	A/B	A/B		
GRO 03126	~	55.9	L5 CHONDRITE	A/B	A		
GRO 03127	~	64.1	L5 CHONDRITE	A/B	A		
GRO 03128	~	70.9	H5 CHONDRITE	B/C	A/B		
GRO 03129	~	52.2	L5 CHONDRITE	B/C	A		
GRO 03130	~	74.2	L5 CHONDRITE	A	A		
GRO 03131	~	67.5	LL5 CHONDRITE	A/B	A		
GRO 03132	~	69.5	L5 CHONDRITE	A/B	A		
GRO 03133	~	114.8	LL5 CHONDRITE	A/B	A		
GRO 03134	~	69.4	LL5 CHONDRITE	B	A/B		
GRO 03135	~	49.6	LL5 CHONDRITE	A	A		
GRO 03136	~	65.4	LL5 CHONDRITE	B	A/B		
GRO 03137	~	45.6	LL6 CHONDRITE	A	A/B		
GRO 03138	~	61.0	L5 CHONDRITE	C	A/B		
GRO 03139	~	49.0	LL5 CHONDRITE	B/C	A/B		
GRO 03140	~	37.6	LL5 CHONDRITE	A/B	A/B		
GRO 03141	~	26.6	LL5 CHONDRITE	B	B		
GRO 03142	~	26.3	LL5 CHONDRITE	B	B		
GRO 03143	~	20.0	LL6 CHONDRITE	B	B		
GRO 03144	~	6.3	LL5 CHONDRITE	B	B		

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t - samples thawed in MPL (see curator's comments for explanation).

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
GRO 03145	~	5.0	L5 CHONDRITE	B	A		
GRO 03146	~	5.3	LL6 CHONDRITE	B	B		
GRO 03147	~	26.6	LL5 CHONDRITE	B	B		
GRO 03148	~	0.9	L4 CHONDRITE	A/B	A/B		
GRO 03149	~	14.5	LL5 CHONDRITE	B	B		
GRO 03150	~	40.7	LL4 CHONDRITE	A	A		
GRO 03151	~	32.0	LL5 CHONDRITE	A/B	A		
GRO 03152	~	37.9	LL5 CHONDRITE	B	A/B		
GRO 03153	~	10.8	L5 CHONDRITE	B/C	A/B		
GRO 03154	~	21.1	LL5 CHONDRITE	B	A/B		
GRO 03155	~	9.7	LL5 CHONDRITE	B	A/B		
GRO 03156	~	21.4	LL5 CHONDRITE	B	B		
GRO 03157	~	3.1	LL4 CHONDRITE	B	B		
GRO 03158	~	32.9	LL5 CHONDRITE	B	B		
GRO 03159	~	10.0	LL5 CHONDRITE	B/C	B		
GRO 03160	~	23.7	L5 CHONDRITE	B/C	A/B		
GRO 03161	~	0.8	LL5 CHONDRITE	B/C	A/B		
GRO 03162	~	14.7	L5 CHONDRITE	B/C	B		
GRO 03163	~	5.7	L5 CHONDRITE	B/C	B		
GRO 03164	~	13.0	LL5 CHONDRITE	A	A		
GRO 03165	~	31.9	L5 CHONDRITE	C	C		
GRO 03166	~	6.4	L5 CHONDRITE	B/C	B		
GRO 03167	~	32.5	LL6 CHONDRITE	A/B	A		
GRO 03168	~	16.8	L5 CHONDRITE	B/C	B		
GRO 03169	~	1.3	LL6 CHONDRITE	B/C	A/B		
GRO 03170	~	1.1	LL5 CHONDRITE	B	A		
LAP 03787	~	71.4	LL5 CHONDRITE	BE	A		
LAP 03788		8.3	L CHONDRITE (IMPACT MELT)	A/BE	A/B	23	19
LAP 03800	~	1.3	LL5 CHONDRITE	B/C	A/B		
LAP 03801	~	0.5	H5 CHONDRITE	A/B	A		
LAP 03802	~	3.5	H5 CHONDRITE	C	A		
LAP 03803	~	12.3	L5 CHONDRITE	B	B		
LAP 03804	~	9.5	LL5 CHONDRITE	B	B		
LAP 03805	~	1.8	H6 CHONDRITE	C	A		
LAP 03806	~	1.5	H5 CHONDRITE	B/C	A		
LAP 03807	~	2.5	L5 CHONDRITE	C	A		
LAP 03808	~	4.2	H6 CHONDRITE	C	A		
LAP 03809	~	5.0	L5 CHONDRITE	CE	B		
LAP 03810	~	2.9	LL6 CHONDRITE	A/B	A/B		
LAP 03811	~	1.5	L5 CHONDRITE	B/C	B		
LAP 03812	~	2.0	L5 CHONDRITE	C	A		
LAP 03813	~	4.4	LL5 CHONDRITE	B/C	B		
LAP 03814	~	3.3	L5 CHONDRITE	C	B		
LAP 03815	~	3.9	LL6 CHONDRITE	B/C	A/B		
LAP 03816	~	8.0	H5 CHONDRITE	C	A/B		
LAP 03817	~	6.4	L5 CHONDRITE	C	A		
LAP 03818	~	8.5	L5 CHONDRITE	C	A		
LAP 03819	~	6.2	LL5 CHONDRITE	B/C	A		
LAP 03820	~	1.6	H5 CHONDRITE	C	A		
LAP 03821	~	6.4	L5 CHONDRITE	C	A/B		
LAP 03823	~	0.5	LL5 CHONDRITE	C	A		
LAP 03825	~	6.4	LL6 CHONDRITE	B	B		

~Classified by using refractive indices.

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 03826	~	3.2	L5 CHONDRITE	A/B	B		
LAP 03827	~	2.1	LL6 CHONDRITE	A/B	B		
LAP 03828	~	1.1	LL5 CHONDRITE	B	B		
LAP 03829	~	1.5	L5 CHONDRITE	C	A		
LAP 03834		5.8	CK3 CHONDRITE	B/C	A/B	4-42	11-20
LAP 03840	~	5.9	LL6 CHONDRITE	B	A/B		
LAP 03841	~	9.7	LL6 CHONDRITE	B	B		
LAP 03842	~	9.0	L5 CHONDRITE	B/C	A/B		
LAP 03843	~	19.9	LL6 CHONDRITE	B	B		
LAP 03844	~	35.6	L5 CHONDRITE	B	A/B		
LAP 03845	~	10.2	H5 CHONDRITE	C	B		
LAP 03846	~	14.0	LL5 CHONDRITE	B	A/B		
LAP 03847	~	13.4	LL5 CHONDRITE	B	B		
LAP 03848	~	14.3	LL5 CHONDRITE	B	B		
LAP 03849	~	13.2	LL5 CHONDRITE	B	B		
LAP 03851		0.4	LL6 CHONDRITE	B	A	30	24
LAP 03865		19.2	CM2 CHONDRITE	C	B	0-54	
LAP 03880	~	4.1	LL6 CHONDRITE	B/C	B		
LAP 03881	~	6.3	H5 CHONDRITE	C	A/B		
LAP 03882	~	0.8	H5 CHONDRITE	C	A/B		
LAP 03883	~	0.9	L5 CHONDRITE	B/C	B		
LAP 03884	~	3.7	L5 CHONDRITE	B	B		
LAP 03885	~	0.2	H5 CHONDRITE	C	A/B		
LAP 03886	~	3.8	L5 CHONDRITE	B/C	B		
LAP 03887	~	1.2	L5 CHONDRITE	B/C	B		
LAP 03888	~	2.6	H5 CHONDRITE	C	A/B		
LAP 03889	~	0.8	LL5 CHONDRITE	B/C	B		
LAP 03922		16.0	H CHONDRITE (IMPACT MELT)	C	B	19	17
LAP 03923		20.6	CK5 CHONDRITE	A/B	A	31	25
LAP 03930		8.8	EL3 CHONDRITE	B/C	B		0-17
LAP 03931	~	4.2	LL6 CHONDRITE	A/B	A		
LAP 03932	~	1.0	L5 CHONDRITE	B/C	A		
LAP 03933	~	9.4	L5 CHONDRITE	B/C	A		
LAP 03934	~	0.8	H6 CHONDRITE	B/C	A		
LAP 03935	~	4.0	L5 CHONDRITE	B/C	A		
LAP 03936	~	10.4	LL6 CHONDRITE	A/B	A/B		
LAP 03937	~	3.5	L5 CHONDRITE	B/C	A/B		
LAP 03938	~	4.3	L5 CHONDRITE	B/C	A		
LAP 03939	~	2.0	LL5 CHONDRITE	A/B	A		
LAP 03940	~t	22.5	LL6 CHONDRITE	B	B		
LAP 03941	~t	0.3	L5 CHONDRITE	B/C	B		
LAP 03942	~t	8.6	L5 CHONDRITE	B/C	B		
LAP 03943	~t	11.4	H5 CHONDRITE	CE	B		
LAP 03944	~t	5.1	LL5 CHONDRITE	BE	A/B		
LAP 03945	~t	6.1	LL6 CHONDRITE	B	A/B		
LAP 03946	~t	11.2	LL5 CHONDRITE	B	A/B		
LAP 03947	~t	3.3	H5 CHONDRITE	A/B	A/B		
LAP 03948	~t	12.5	LL6 CHONDRITE	A/B	A/B		
LAP 03949	~t	3.7	L5 CHONDRITE	C	B/C		
LAP 03951		7.4	LL6 CHONDRITE	C	B	30	25
LAP 03954		37.1	H5 CHONDRITE	C	C	19	17
LAP 03960	~	20.9	LL5 CHONDRITE	B/C	A		
LAP 03961	~	19.4	LL5 CHONDRITE	A/B	A		

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Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 03962	~	36.7	L5 CHONDRITE	B	A		
LAP 03963	~	22.8	LL5 CHONDRITE	B	A		
LAP 03964	~	22.4	LL5 CHONDRITE	A/B	A		
LAP 03965		17.6	H4 CHONDRITE	B/C	A	19	7-21
LAP 03966	~	9.8	LL5 CHONDRITE	B/C	A		
LAP 03967	~	1.0	LL5 CHONDRITE	B/C	A		
LAP 03968	~	7.2	LL5 CHONDRITE	B/C	A		
LAP 03969	~	0.2	LL5 CHONDRITE	B/C	A		
LAP 03970	~	24.3	L5 CHONDRITE	B/C	A		
LAP 03971	~	5.1	L5 CHONDRITE	A/B	A		
LAP 03972	~	0.6	L5 CHONDRITE	A/B	A		
LAP 03973	~	4.8	H5 CHONDRITE	B/C	B		
LAP 03974	~	5.7	L5 CHONDRITE	B/C	A		
LAP 03975	~	3.1	LL5 CHONDRITE	A/B	A		
LAP 03976	~	6.5	L5 CHONDRITE	B/C	A		
LAP 03977	~	4.2	L5 CHONDRITE	B/C	A		
LAP 03978	~	12.9	LL5 CHONDRITE	A/B	A/B		
LAP 03980	~	16.1	LL6 CHONDRITE	B/C	A/B		
LAP 03981	~	45.4	L6 CHONDRITE	B/C	A/B		
LAP 03982	~	24.5	H5 CHONDRITE	C	A		
LAP 03983	~	25.5	H5 CHONDRITE	C	A/B		
LAP 03984	~	7.4	H5 CHONDRITE	C	A		
LAP 03985	~	0.8	L5 CHONDRITE	B/C	A		
LAP 03986	~	4.1	LL5 CHONDRITE	B	B/C		
LAP 03987	~	4.2	H5 CHONDRITE	C	B/C		
LAP 03988	~	4.5	H5 CHONDRITE	C	A/B		
LAP 03989	~	8.9	L5 CHONDRITE	B/C	A/B		
LAP 03990	~	18.7	L5 CHONDRITE	C	A/B		
LAP 03992	~	32.3	L5 CHONDRITE	C	A/B		
LAP 03993	~	13.4	LL6 CHONDRITE	B	B		
LAP 03994	~	26.5	LL4 CHONDRITE	B	A		
LAP 03995	~	27.5	LL6 CHONDRITE	B	B		
LAP 03996	~	14.1	L5 CHONDRITE	C	B		
LAP 03997	~	38.4	H5 CHONDRITE	C	A/B		
LAP 03998	~	12.3	LL5 CHONDRITE	B	B		
LAP 03999	~	8.1	LL5 CHONDRITE	B	B		
LAP 031001	~	37.5	LL6 CHONDRITE	B	A/B		
LAP 031002	~	4.4	LL5 CHONDRITE	A	A		
LAP 031003	~	9.6	LL5 CHONDRITE	A	A		
LAP 031004	~	6.5	H6 CHONDRITE	C	A/B		
LAP 031005	~	8.6	L5 CHONDRITE	B/C	A/B		
LAP 031006	~	19.0	LL5 CHONDRITE	A/B	A/B		
LAP 031007	~	8.0	H5 CHONDRITE	C	B		
LAP 031008	~	5.2	LL6 CHONDRITE	B	A		
LAP 031009	~	31.7	LL6 CHONDRITE	B	A/B		
LAP 031030	~	6.2	L6 CHONDRITE	B	A/B		
LAP 031031	~	1.8	L5 CHONDRITE	C	A/B		
LAP 031032	~	2.7	H5 CHONDRITE	C	B		
LAP 031033	~	3.8	H5 CHONDRITE	C	B		
LAP 031034	~	0.4	LL5 CHONDRITE	A/B	A/B		
LAP 031035	~	1.2	H6 CHONDRITE	B	A/B		
LAP 031036	~	1.6	H5 CHONDRITE	C	B		
LAP 031038	~	0.5	LL5 CHONDRITE	A/B	A/B		

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Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 031039 ~	2.7	L5 CHONDRITE	B	A		
LAP 031040 ~	21.3	H5 CHONDRITE	C	A/B		
LAP 031041 ~	28.2	L5 CHONDRITE	C	A/B		
LAP 031042 ~	3.9	LL5 CHONDRITE	A	A		
LAP 031044 ~	4.9	L5 CHONDRITE	C	A/B		
LAP 031045 ~	16.6	LL5 CHONDRITE	B	B		
LAP 031048 ~	5.3	LL5 CHONDRITE	A/B	A/B		
LAP 031049 ~	7.8	LL5 CHONDRITE	B/C	B		
LAP 031050 ~	30.5	H6 CHONDRITE	B/C	A		
LAP 031051 ~	5.2	LL5 CHONDRITE	A/B	A		
LAP 031052 ~	16.6	LL5 CHONDRITE	A/B	A		
LAP 031053 ~	5.9	L5 CHONDRITE	A/B	A		
LAP 031054 ~	9.5	L5 CHONDRITE	B/C	A		
LAP 031055 ~	3.5	LL5 CHONDRITE	B/C	A/B		
LAP 031056 ~	4.4	LL5 CHONDRITE	A/B	A		
LAP 031057 ~	7.6	H6 CHONDRITE	B/C	A		
LAP 031058 ~	16.9	LL5 CHONDRITE	B/C	A		
LAP 031059 ~	16.9	LL5 CHONDRITE	B/C	A/B		
LAP 031060 ~	16.1	H5 CHONDRITE	C	B		
LAP 031061 ~	15.8	L5 CHONDRITE	C	B		
LAP 031063 ~	14.5	LL5 CHONDRITE	C	B		
LAP 031064	21.7	LL6 CHONDRITE	C	B	30	25
LAP 031065 ~	4.3	L5 CHONDRITE	C	B		
LAP 031066 ~	9.3	LL6 CHONDRITE	C	B		
LAP 031067 ~	21.6	LL5 CHONDRITE	B	B		
LAP 031068 ~	4.3	LL5 CHONDRITE	C	B		
LAP 031069 ~	4.8	L5 CHONDRITE	B	A		
LAP 031070 ~	0.1	L5 CHONDRITE	B	A		
LAP 031071 ~	2.2	LL5 CHONDRITE	C	B		
LAP 031072 ~	0.8	H6 CHONDRITE	B/C	A		
LAP 031073 ~	2.8	LL6 CHONDRITE	A/B	A/B		
LAP 031074 ~	0.8	L5 CHONDRITE	B	A		
LAP 031075 ~	5.4	L5 CHONDRITE	C	B		
LAP 031076 ~	7.3	L5 CHONDRITE	C	B		
LAP 031077 ~	1.5	L5 CHONDRITE	A/B	A/B		
LAP 031078	4.0	L5 CHONDRITE	B/C	A	25	21
LAP 031080 ~	2.2	LL5 CHONDRITE	B	B		
LAP 031081 ~	1.4	LL6 CHONDRITE	A/B	A		
LAP 031082 ~	2.0	LL6 CHONDRITE	A	A		
LAP 031083 ~	1.3	LL5 CHONDRITE	B	B		
LAP 031084 ~	2.9	L5 CHONDRITE	B	B		
LAP 031085 ~	4.4	LL5 CHONDRITE	B	B		
LAP 031086 ~	1.7	L5 CHONDRITE	C	B		
LAP 031087 ~	0.3	LL5 CHONDRITE	B	B		
LAP 031088 ~	6.3	L5 CHONDRITE	B/C	B		
LAP 031089 ~	0.3	LL5 CHONDRITE	A/B	A		
LAP 031090 ~	0.8	L5 CHONDRITE	B/C	B		
LAP 031091 ~	1.6	H5 CHONDRITE	C	B		
LAP 031092 ~	1.9	H5 CHONDRITE	C	B		
LAP 031093 ~	6.7	LL6 CHONDRITE	C	B		
LAP 031094 ~	4.7	H5 CHONDRITE	C	B		
LAP 031095 ~	5.0	L5 CHONDRITE	C	A/B		
LAP 031096 ~	1.7	LL4 CHONDRITE	A/B	A/B		

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Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 031097	2.1	H3 CHONDRITE	B	A/B	6-37	8-22
LAP 031098 ~	1.5	H5 CHONDRITE	B/C	A/B		
LAP 031099 ~	3.1	LL6 CHONDRITE	B/C	A/B		
LAP 031100 ~	18.2	LL5 CHONDRITE	B/C	A		
LAP 031101 ~	15.5	H5 CHONDRITE	C	A		
LAP 031102 ~	17.8	LL5 CHONDRITE	B/C	A		
LAP 031103 ~	21.0	LL5 CHONDRITE	B/C	A		
LAP 031104 ~	3.3	L5 CHONDRITE	B/C	A		
LAP 031105 ~	14.0	LL5 CHONDRITE	B	A		
LAP 031106 ~	17.8	L6 CHONDRITE	C	A		
LAP 031107 ~	28.5	L5 CHONDRITE	B/C	A		
LAP 031108 ~	8.9	L5 CHONDRITE	B/C	A		
LAP 031110 ~	0.8	H6 CHONDRITE	B	A		
LAP 031111 ~	1.9	L5 CHONDRITE	B/C	A		
LAP 031112 ~	5.8	L5 CHONDRITE	B/C	A		
LAP 031114 ~	2.6	LL5 CHONDRITE	A	A		
LAP 031115 ~	9.3	H5 CHONDRITE	B/C	A		
LAP 031116 ~	3.2	L5 CHONDRITE	B/C	A		
LAP 031118 ~	1.4	LL6 CHONDRITE	A/B	A		
LAP 031119 ~	5.5	L5 CHONDRITE	B/C	A/B		
LAP 031130 ~	0.9	H5 CHONDRITE	B/C	A		
LAP 031131 ~	4.2	L5 CHONDRITE	C	A/B		
LAP 031132 ~	3.8	L5 CHONDRITE	C	B		
LAP 031133 ~	4.3	L5 CHONDRITE	C	A/B		
LAP 031134 ~	3.5	L5 CHONDRITE	C	A		
LAP 031135	2.7	R CHONDRITE	A	A	40	21-30
LAP 031136 ~	2.2	L5 CHONDRITE	C	B		
LAP 031137 ~	9.1	L5 CHONDRITE	C	B		
LAP 031138 ~	5.8	H5 CHONDRITE	C	A/B		
LAP 031139 ~	3.4	L5 CHONDRITE	C	A/B		
LAP 031141 ~	0.3	H5 CHONDRITE	B	A		
LAP 031143 ~	0.2	LL5 CHONDRITE	B	A		
LAP 031145 ~	1.0	LL5 CHONDRITE	B	A		
LAP 031150 ~	0.8	LL5 CHONDRITE	A	A/B		
LAP 031151 ~	2.6	LL5 CHONDRITE	A	A/B		
LAP 031152 ~	35.7	L5 CHONDRITE	B/C	A/B		
LAP 031153 ~	11.6	L5 CHONDRITE	B/C	B		
LAP 031154 ~	2.2	H5 CHONDRITE	C	C		
LAP 031155 ~	21.8	LL5 CHONDRITE	C	A/B		
LAP 031156	14.7	R CHONDRITE	B	B	38	31
LAP 031157 ~	2.2	H5 CHONDRITE	A/B	A		
LAP 031158	4.4	CK5 CHONDRITE	B	B	27	
LAP 031159 ~	8.5	LL5 CHONDRITE	A/B	A/B		
LAP 031170 ~	3.2	H5 CHONDRITE	C	A		
LAP 031171 ~	1.8	LL6 CHONDRITE	B/C	A		
LAP 031172 ~	1.6	LL6 CHONDRITE	B/C	A		
LAP 031173	1.4	H CHONDRITE (IMPACT MELT)	C	C	19	17
LAP 031174 ~	1.9	H5 CHONDRITE	C	B		
LAP 031175 ~	2.2	L5 CHONDRITE	C	B		
LAP 031176 ~	1.5	LL5 CHONDRITE	B	A		
LAP 031177 ~	2.8	H5 CHONDRITE	C	A/B		
LAP 031178 ~	3.0	LL5 CHONDRITE	C	C		
LAP 031179 ~	6.2	L5 CHONDRITE	C	B		

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Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 031180 ~	5.2	L5 CHONDRITE	B/C	B		
LAP 031181 ~	11.2	L5 CHONDRITE	B/C	B		
LAP 031182 ~	7.2	L5 CHONDRITE	C	A/B		
LAP 031183 ~	10.3	L5 CHONDRITE	C	A/B		
LAP 031184 ~	1.7	LL5 CHONDRITE	A/B	C		
LAP 031185 ~	3.5	LL5 CHONDRITE	B/C	B		
LAP 031186 ~	15.2	LL5 CHONDRITE	B/C	A/B		
LAP 031187 ~	3.0	LL5 CHONDRITE	C	B		
LAP 031188 ~	8.4	H5 CHONDRITE	C	A/B		
LAP 031189 ~	11.2	LL5 CHONDRITE	C	B		
LAP 031210 ~t	16.9	LL5 CHONDRITE	A/B	A		
LAP 031211 ~t	6.0	H5 CHONDRITE	B/C	A/B		
LAP 031212 ~t	21.9	L5 CHONDRITE	B/C	B		
LAP 031213 ~t	28.3	LL5 CHONDRITE	A/B	A/B		
LAP 031214 t	9.5	CM1/2 CHONDRITE	B	B	1-41	
LAP 031215 ~t	10.4	L5 CHONDRITE	B	B		
LAP 031216 ~t	6.3	LL5 CHONDRITE	B	A/B		
LAP 031217 ~t	16.3	L4 CHONDRITE	B/C	B		
LAP 031218 ~t	10.1	LL6 CHONDRITE	A	A/B		
LAP 031219 ~t	10.2	H5 CHONDRITE	C	A		
LAP 031240 ~t	1.5	H5 CHONDRITE	BE	A		
LAP 031241 ~t	3.7	LL5 CHONDRITE	B	B		
LAP 031242 ~t	10.9	H5 CHONDRITE	C	C		
LAP 031243 ~t	9.5	L5 CHONDRITE	B	B		
LAP 031244 ~t	10.8	LL6 CHONDRITE	A/B	B		
LAP 031245 ~t	3.3	L6 CHONDRITE	B	B		
LAP 031246 ~t	4.6	L5 CHONDRITE	C	B		
LAP 031247 ~t	2.6	L5 CHONDRITE	C	A/B		
LAP 031248 t	7.4	H4 CHONDRITE	C	A/B	19	3-18
LAP 031249 ~t	7.1	H5 CHONDRITE	C	B		
LAP 031251 ~	0.2	L5 CHONDRITE	B	A		
LAP 031255 ~	0.3	LL5 CHONDRITE	B	A		
LAP 031256 ~	0.5	H5 CHONDRITE	B	A		
LAP 031279 ~	0.5	H5 CHONDRITE	B	A		
LAP 031280 t	17.8	EUCRITE (BRECCIATED)	B	A/B		60
LAP 031281 ~t	13.0	LL5 CHONDRITE	A/B	A/B		
LAP 031282 ~t	7.2	LL5 CHONDRITE	A/B	A/B		
LAP 031283 ~t	2.3	H5 CHONDRITE	C	B/C		
LAP 031284 ~t	6.2	H5 CHONDRITE	C	A/B		
LAP 031285 ~t	22.8	L5 CHONDRITE	B/C	B		
LAP 031286 ~t	2.6	LL6 CHONDRITE	A/B	B		
LAP 031287 ~t	0.4	LL5 CHONDRITE	A/B	A/B		
LAP 031288 ~t	2.8	L5 CHONDRITE	C	B		
LAP 031289 ~t	2.0	LL6 CHONDRITE	A/B	B		
LAP 031320 ~t	0.3	L5 CHONDRITE	C	B		
LAP 031322 ~t	4.7	H5 CHONDRITE	C	B		
LAP 031323 t	3.1	ACAPULCOITE	C	B	13	12
LAP 031324 ~t	2.4	L5 CHONDRITE	C	B		
LAP 031325 ~t	0.3	L6 CHONDRITE	B/C	B		
LAP 031326 ~t	2.5	L5 CHONDRITE	C	B		
LAP 031327 ~t	2.6	LL5 CHONDRITE	A	A/B		
LAP 031328 ~t	1.0	L5 CHONDRITE	C	B		

~Classified by using refractive indices.
t - samples thawed in MPL (see curator's comments for explanation).

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 031329	~t	1.0	L5 CHONDRITE	C	B		
LAP 031390	~	1.8	L5 CHONDRITE	B	A		
LAP 031396	~	1.1	H5 CHONDRITE	B	A		
LAP 031397	~	0.2	H5 CHONDRITE	B	A		
MIL 03330	~	8709.8	L5 CHONDRITE	C	C		
MIL 03360	~t	517.6	L5 CHONDRITE	B/C	A/B		
MIL 03361	~t	424.1	H5 CHONDRITE	C	A/B		
MIL 03362	~t	400.2	LL5 CHONDRITE	BE	B		
MIL 03363	~t	565.7	H5 CHONDRITE	C	C		
MIL 03364	~t	277.6	LL5 CHONDRITE	A/B	A/B		
MIL 03400	~t	3.2	LL5 CHONDRITE	B	B		
MIL 03401	~t	5.5	LL6 CHONDRITE	B	B		
MIL 03402	~t	5.2	H5 CHONDRITE	C	B/C		
MIL 03403	~t	11.7	LL5 CHONDRITE	A	A/B		
MIL 03404	~t	30.4	LL6 CHONDRITE	B	B		
MIL 03405	~t	4.9	LL6 CHONDRITE	B	B		
MIL 03406	~t	16.0	LL5 CHONDRITE	B	B		
MIL 03407	~t	8.0	LL6 CHONDRITE	A/B	A		
MIL 03408	~t	1.4	L5 CHONDRITE	C	C		
MIL 03409	~t	5.9	L5 CHONDRITE	BE	B		
MIL 03410	~t	24.6	H5 CHONDRITE	C	A/B		
MIL 03411	~t	14.6	H5 CHONDRITE	C	A/B		
MIL 03412	~t	26.5	H5 CHONDRITE	C	B		
MIL 03413	~t	4.0	L4 CHONDRITE	CE	B		
MIL 03414	~t	58.5	H5 CHONDRITE	C	B		
MIL 03415	~t	3.5	H6 CHONDRITE	C	B		
MIL 03416	~t	3.5	LL6 CHONDRITE	B	B		
MIL 03417	~t	3.5	LL5 CHONDRITE	B	B		
MIL 03418	~t	24.3	LL5 CHONDRITE	B	B		
MIL 03419	~t	15.1	LL6 CHONDRITE	A/B	B		
CMS 04016		162.1	L3 CHONDRITE	C	C	1-26	5-12
LAP 04531	~	0.0	FUSION CRUST (CHON.)	B	A		
LAP 04532	~	0.1	H6 CHONDRITE	B	A		
LAP 04533	~	0.5	H5 CHONDRITE	B	A		
LAP 04534	~	0.1	L5 CHONDRITE	B	A		
LAP 04535	~	0.6	H5 CHONDRITE	B	A		
LAP 04536	~	1.2	H5 CHONDRITE	B	A		
LAP 04537	~	0.6	H5 CHONDRITE	B	A		
LAP 04538	~	0.4	L5 CHONDRITE	B	A		
LAP 04539	~	0.6	LL5 CHONDRITE	B	A		
LAP 04640	~	0.9	L5 CHONDRITE	B	A		
LAP 04641	~	0.8	L5 CHONDRITE	B	A		
LAP 04642		1.2	H CHONDRITE (IMPACT MELT)	B	A	19	17
LAP 04643	~	0.7	L5 CHONDRITE	B	A		
LAP 04644	~	0.6	FUSION CRUST (CHON.)	B	A		
LAP 04645	~	0.3	LL5 CHONDRITE	B	A		
LAP 04646	~	0.6	H6 CHONDRITE	B	A		
LAP 04647	~	0.4	L5 CHONDRITE	B	A		
LAP 04648	~	1.4	H6 CHONDRITE	B	A		
LAP 04649	~	0.3	L5 CHONDRITE	B	A		

~Classified by using refractive indices.
t - samples thawed in MPL (see curator's comments for explanation).

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 04840	50.4	R CHONDRITE	A/B	A/B	38	30
LAP 04842	59.7	LL6 CHONDRITE	B	A/B	30	25
LAP 04843	108.6	CV3 CHONDRITE	B/CE	B	1-46	1
LAP 04844	6.8	DIOGENITE	B	B		23
MAC 04862 ~	0.7	L5 CHONDRITE	B	A/B		
MAC 04863 ~	1.0	L5 CHONDRITE	B	A/B		
MAC 04864 ~	0.4	L5 CHONDRITE	B	A		
MAC 04865	0.5	H4 CHONDRITE	B	A	20	18
MAC 04866 ~	1.2	L5 CHONDRITE	B	A		
MAC 04867 ~	0.6	L5 CHONDRITE	B	A		
MAC 04868 ~	0.4	L5 CHONDRITE	B	A		
MAC 04870 ~	0.6	H5 CHONDRITE	B	A		
MAC 04871	0.7	H4 CHONDRITE	B	A	20	16-24
MAC 04872 ~	0.3	L5 CHONDRITE	B	A		
MAC 04874 ~	0.2	L5 CHONDRITE	B	A		
MAC 04876	0.2	H5 CHONDRITE	B	A	19	16
MAC 04877 ~	0.4	L5 CHONDRITE	B	A		
MAC 04880 ~	0.9	H5 CHONDRITE	B	A		
MAC 04881 ~	1.4	L5 CHONDRITE	B	A		
MAC 04882 ~	2.0	L4 CHONDRITE	B	A		
MAC 04883 ~	1.1	L5 CHONDRITE	B	A		
MAC 04884 ~	0.3	L4 CHONDRITE	B	A		
MAC 04885 ~	0.5	L5 CHONDRITE	B	A		
MAC 04886 ~	0.6	L4 CHONDRITE	B	A		
MAC 04887 ~	1.9	LL5 CHONDRITE	B	A		
MAC 04888 ~	1.1	H5 CHONDRITE	B	A		
MAC 04889 ~	0.5	H5 CHONDRITE	B	A		
MAC 04900	17.7	LL6 CHONDRITE	B	C	30	25
MAC 04903 ~	0.4	L5 CHONDRITE	B	A		
MAC 04904 ~	1.0	L5 CHONDRITE	B	A		
MAC 04905 ~	0.2	L5 CHONDRITE	B	A		
MAC 04906 ~	0.5	L4 CHONDRITE	B	A		
MAC 04907 ~	0.7	L5 CHONDRITE	B	A		
MAC 04908 ~	0.2	L5 CHONDRITE	B	A		
MAC 04909 ~	0.3	L5 CHONDRITE	B	A		
MAC 04911 ~	0.8	H5 CHONDRITE	B	A		
MAC 04912 ~	1.3	H5 CHONDRITE	B	A		
MAC 04915 ~	0.4	H5 CHONDRITE	B	A		
MAC 04918 ~	0.8	L5 CHONDRITE	B	A		
MAC 04919 ~	0.4	L5 CHONDRITE	B	A		
MAC 04930	0.9	H3 CHONDRITE	B	A	2-24	3-12
MAC 04931 ~	0.3	H5 CHONDRITE	B	A		
MAC 04932 ~	0.2	L5 CHONDRITE	B	A		
MAC 04933 ~	0.3	L5 CHONDRITE	B	A		
MAC 04934 ~	0.4	L5 CHONDRITE	B	A		
MAC 04935 ~	0.4	L5 CHONDRITE	B	A		
MAC 04936 ~	0.7	L5 CHONDRITE	B	A		
MAC 04937 ~	0.8	L5 CHONDRITE	B	A		
MAC 04938 ~	1.5	H5 CHONDRITE	B	A		
MAC 04939 ~	0.7	H5 CHONDRITE	B	A		
MAC 04940 ~	0.7	H4 CHONDRITE	B	A		
MAC 04941 ~	0.4	H5 CHONDRITE	B	A		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MAC 04946 ~	0.7	L5 CHONDRITE	B	A		
MAC 04947 ~	0.2	L5 CHONDRITE	B	A		
MAC 04948 ~	0.6	L4 CHONDRITE	B	A		
MAC 04955 ~	0.4	H4 CHONDRITE	B	A		
MAC 04956 ~	0.6	H5 CHONDRITE	B	A		
MAC 04957 ~	0.3	H5 CHONDRITE	B	A		
MAC 04958 ~	0.7	H5 CHONDRITE	B	A		
MAC 04959 ~	0.5	H5 CHONDRITE	B	A		
MAC 04960 ~	0.3	H5 CHONDRITE	B	A		
MAC 04961 ~	0.1	H CHONDRITE	B	A		
MAC 04962 ~	0.2	H5 CHONDRITE	B	A		
MAC 04963 ~	0.6	H5 CHONDRITE	B	A		
MAC 04964 ~	0.6	H5 CHONDRITE	B	A		
MAC 04965 ~	0.9	L5 CHONDRITE	B	A		
MAC 04966 ~	1.3	L5 CHONDRITE	B	A		
MAC 04968 ~	0.5	H6 CHONDRITE	B	A		
MAC 04970 ~	0.6	L5 CHONDRITE	B	A		
MAC 04972 ~	0.3	H5 CHONDRITE	B	A		
MAC 04973 ~	0.7	L5 CHONDRITE	B	A		
MAC 04974 ~	0.2	L5 CHONDRITE	B	A		
MAC 04977 ~	1.1	L5 CHONDRITE	B	A		
MAC 04978 ~	0.2	L5 CHONDRITE	B	A		
MAC 04979 ~	0.4	L5 CHONDRITE	B	A		
MAC 04980 ~	0.6	H5 CHONDRITE	B	A		
MAC 04981 ~	0.2	H5 CHONDRITE	B	A		
MAC 04982 ~	1.4	L5 CHONDRITE	B	A		
MAC 04983 ~	0.2	LL5 CHONDRITE	B	A		
MAC 04984 ~	0.1	H5 CHONDRITE	B	A		
MAC 04985 ~	0.8	L5 CHONDRITE	B	A		
MAC 04986 ~	0.2	H5 CHONDRITE	B	A		
MAC 04987 ~	0.6	L5 CHONDRITE	B	A		
MAC 04988 ~	0.2	H5 CHONDRITE	B	A		
MAC 04989 ~	0.6	L5 CHONDRITE	B	A		
MAC 041027 ~	0.6	L5 CHONDRITE	B	A		
MAC 041030 ~	0.3	H5 CHONDRITE	B	A		
MAC 041031 ~	0.6	L5 CHONDRITE	B	A		
MAC 041032 ~	0.6	L5 CHONDRITE	B	A		
MAC 041033 ~	0.5	L5 CHONDRITE	B	A		
MAC 041034 ~	0.4	L5 CHONDRITE	B	A		
MAC 041035 ~	0.9	L5 CHONDRITE	B	A		
MAC 041036 ~	0.7	L5 CHONDRITE	B	A		
MAC 041037 ~	0.6	H5 CHONDRITE	B	A		
MAC 041038 ~	1.3	L5 CHONDRITE	B	A		
MAC 041039 ~	1.1	H5 CHONDRITE	B	A		
MAC 041075 ~	0.6	H5 CHONDRITE	B	A		
MAC 041076 ~	1.3	L5 CHONDRITE	B	A		
MAC 041077 ~	1.2	L5 CHONDRITE	B	A		
MAC 041078 ~	0.7	H5 CHONDRITE	B	A		
MAC 041079 ~	0.9	L5 CHONDRITE	B	A		
MAC 041080 ~	0.7	L5 CHONDRITE	B	A		
MAC 041081 ~	1.3	L5 CHONDRITE	B	A		
MAC 041082 ~	0.7	L5 CHONDRITE	B	A		
MAC 041083 ~	1.1	L5 CHONDRITE	B	A		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MAC 041084 ~	1.2	L5 CHONDRITE	B	A		
MAC 041097 ~	1.3	L5 CHONDRITE	B	A		
MAC 041100 ~	0.9	L5 CHONDRITE	B	A		
MAC 041101 ~	0.6	H5 CHONDRITE	B	A		
MAC 041102 ~	0.7	L5 CHONDRITE	B	A		
MAC 041103 ~	0.7	H5 CHONDRITE	B	A		
MAC 041104 ~	1.0	L5 CHONDRITE	B	A		
MAC 041105 ~	0.2	L5 CHONDRITE	B	A		
MAC 041106 ~	0.7	L5 CHONDRITE	B	A		
MAC 041107 ~	0.6	L5 CHONDRITE	B	A		
MAC 041108 ~	0.5	L5 CHONDRITE	B	A		
MAC 041109 ~	0.4	L5 CHONDRITE	B	A		
MAC 041110 ~	0.7	L5 CHONDRITE	B	A		
MAC 041111 ~	0.9	L5 CHONDRITE	B	A		
MAC 041112 ~	0.6	L5 CHONDRITE	B	A		
MAC 041113 ~	0.2	L5 CHONDRITE	B	A		
MAC 041114 ~	1.0	L5 CHONDRITE	B	A		
MAC 041115 ~	1.3	L5 CHONDRITE	B	A		
MAC 041116 ~	1.3	L5 CHONDRITE	B	A		
MAC 041117 ~	0.5	LL5 CHONDRITE	B	A		
MAC 041118 ~	0.3	L5 CHONDRITE	B	A		
MAC 041119 ~	0.5	H5 CHONDRITE	B	A		
MAC 041164 ~	1.2	L5 CHONDRITE	B	A		
MAC 041169	3.2	EUCRITE (UNBRECCIATED)	B	B		57-64
MAC 041269	4.5	HOWARDITE	B	B		56

**Notes to Tables 1 and 2:

"Weathering" Categories:

A: Minor rustiness; rust haloes on metal particles and rust stains along fractures are minor.
B: Moderate rustiness; large rust haloes occur on metal particles and rust stains on internal fractures are extensive.
C: Severe rustiness; metal particles have been mostly stained by rust throughout.
E: Evaporite minerals visible to the naked eye.

"Fracturing" Categories:

A: Minor cracks; few or no cracks are conspicuous to the naked eye and no cracks penetrate the entire specimen.
B: Moderate cracks; several cracks extend across exterior surfaces and the specimen can be readily broken along the cracks.
C: Severe cracks; specimen readily crumbles along cracks that are both extensive and abundant.

~Classified by using refractive indices.

Table 2
Newly Classified Specimens Listed By Type

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
			Achondrites				
LAP 031323	t	3.1	ACAPULCOITE	C	B	13	12
LAP 04844		6.8	DIOGENITE	B	B	23	
LAP 031280	t	17.8	EUCRITE (BRECCIATED)	B	A/B		
MAC 041169		3.2	EUCRITE (UNBRECCIATED)	B	B	57-64	
MAC 041269		4.5	HOWARDITE	B	B	56	
			Carbonaceous Chondrites				
LAP 03834		5.8	CK3 CHONDRITE	B/C	A/B	4-42	11-20
LAP 03923		20.6	CK5 CHONDRITE	A/B	A	31	25
LAP 031158		4.4	CK5 CHONDRITE	B	B	27	
LAP 031214	t	9.5	CM1/2 CHONDRITE	B	B	1-41	
LAP 03865		19.2	CM2 CHONDRITE	C	B	0-54	
LAP 04843		108.6	CV3 CHONDRITE	B/C	B	1-46	1
			Chondrites - Type 3				
LAP 031097		2.1	H3 CHONDRITE	B	A/B	6-37	8-22
MAC 04930		0.9	H3 CHONDRITE	B	A	2-24	3-12
DOM 03181		5363.9	L3 CHONDRITE	B/C	A/B	1-37	1-5
GRO 03015		480.0	L3 CHONDRITE	B	A	1-29	3-29
GRO 03061		455.0	L3 CHONDRITE	B	A/B	1-29	3-21
CMS 04016		162.1	L3 CHONDRITE	C	C	1-26	5-12
			E Chondrite				
LAP 03930		8.8	EL3 CHONDRITE	B/C	B	0-17	
			H Chondrite				
LAP 03922		16.0	H CHONDRITE (IMPACT MELT)	C	B	19	17
LAP 031173		1.4	H CHONDRITE (IMPACT MELT)	C	C	19	17
LAP 04642		1.2	H CHONDRITE (IMPACT MELT)	B	A	19	17

t - samples thawed in MPL (see curator's comments for explanation).

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
		L Chondrite				
LAP 03788	8.3	L CHONDRITE (IMPACT MELT)	A/B	A/B	23	19
		R Chondrites				
LAP 031135	2.7	R CHONDRITE	A	A	40	21-30
LAP 031156	14.7	R CHONDRITE	B	B	38	31
LAP 04840	50.4	R CHONDRITE	A/B	A/B	38	30

Table 3
Tentative Pairings for New Meteorites

Table 3 summarizes possible pairings of the new specimens with each other and with previously classified specimens based on descriptive data in this newsletter issue. Readers who desire a more comprehensive review of the meteorite pairings in the U.S. Antarctic collection should refer to the compilation provided by Dr. E.R. D. Scott, as published in issue 9(2) (June 1986). Possible pairings were updated in Meteoritical Bulletins No. 76 (Meteoritics 29, 100-143), No. 79 (Meteoritics and Planetary Science 31, A161-174), No. 82 (Meteoritics and Planetary Science 33, A221-A239), No. 83 (Meteoritics and Planetary Science 34, A169-A186), No. 84 (Meteoritics and Planetary Science 35, A199-A225), No. 85 (Meteoritics and Planetary Science 36, A293-A322), No. 86 (Meteoritics and Planetary Science 37, A157-A184), No. 87 (Meteoritics and Planetary Science 38, A189-A248), No. 88 (Meteoritics and Planetary Science 39, A215-A272), and No. 89 (Meteoritics and Planetary Science 40, A201-A263), No.90 (Meteoritics and Planetary Science 41, in press).

H Chondrite (Impact Melt)

LAP 04642 with LAP 031173

L3 Chondrite

GRO 03061 with GRO 03015

R Chondrite

LAP 031156 with LAP 031135

Petrographic Descriptions

Sample No.:	DOM 03181
Location:	Dominion Range
Field No.:	14349
Dimensions (cm):	18.0 x 15.5 x 13.0
Weight (g):	5363.9
Meteorite Type:	L3 Chondrite

Macroscopic Description: Cecilia Satterwhite
The exterior of this ordinary chondrite has black fusion crust on some surfaces. Areas without fusion crust are brown and gray with a coarse grained texture. Abundant light colored inclusions are present. The interior is gray with some oxidation and rusty areas. Light colored mm sized inclusions are visible.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
The section exhibits numerous well-defined chondrules (up to 1.5 mm) in a black matrix of fine-grained silicates, metal and troilite. Polysynthetically twinned pyroxene is extremely abundant and glass is preserved in a few chondrules. Silicates are unequilibrated; olivines range from Fa_{1-37} and pyroxenes from Fs_{1-5}. The meteorite is an L3 chondrite and may be of moderately low subtype (estimated subtype 3.5).

Sample No.:	GRO 03015, GRO 03061
Location:	Grosvenor Mountains
Field No.:	15636; 15606
Dimensions (cm):	10.0 x 5.5 x 5.0; 7.5 x 5.5 x 5.0
Weight (g):	480.0; 455.0
Meteorite Type:	L3 Chondrite

Macroscopic Description: Kathleen McBride
The exteriors of these ordinary chondrites have dull, black weathered fusion crust with polygonal fractures. The interiors are a dark matrix stained with rust. Numerous chondrules and a few irregularly shaped clasts are visible. Metal is also present.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
The meteorites are so similar that a single description suffices. The sections exhibit numerous well-defined chondrules (up to 1.5 mm) in a black matrix of fine-grained silicates, metal and troilite. Polysynthetically twinned pyroxene is abundant. Silicates are unequilibrated; olivines range from Fa_{1-29} and pyroxenes from Fs_{3-29}. The meteorites are L3 chondrites (estimated subtype 3.6).

Sample No.:	LAP 03788
Location :	LaPaz Ice Field
Field No.:	16282
Dimensions (cm):	4.0 x 4.0 x 2.25
Weight (g):	8.3
Meteorite Type:	L Chondrite (Impact Melt)

Macroscopic Description: Kathleen McBride
60% of the exterior of this meteorite has dull black fusion crust with polygonal fractures. The interior is a gray matrix with light gray chondrules and dark gray angular inclusions. Evaporite deposits are seen near the fusion crust. Some rust is present.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
The meteorite exhibits a relatively coarse (50-100 micron grain size), equigranular silicate matrix including rounded to irregular, sulfide-free metal blebs reaching 0.5 mm and vesicles reaching 0.5 mm. Mafic silicate compositions (Fa_{23}, Fs_{19}) indicate L chondrite parentage and texture suggests it is an impact melt.

Sample No.:	LAP 03834
Location:	LaPaz Ice Field
Field No.:	16780
Dimensions (cm):	1.8 x 1.5 x 1.5
Weight (g):	5.838
Meteorite Type:	CK3 Chondrite

Macroscopic Description: Cecilia Satterwhite

80% of the exterior of this meteorite has black fractured fusion crust. The interior is a fine grained gray matrix with some oxidation. Light gray and white mm sized inclusions are visible.

Thin Section (,2) Description: Tim McCoy

The section consists of well-defined (up to 1 mm) chondrules in a matrix of finer-grained silicates, sulfides and very abundant magnetite. The meteorite is little weathered, but extensively shock blackened. Olivine is $Fa_{4-42,}$ with most grains Fa_{30-40}, and orthopyroxene is Fs_{11-20}. The meteorite is a CK3 chondrite.

Sample No.:	LAP 03865
Location:	LaPaz Ice Field
Field No.:	16504
Dimensions (cm):	4.0 x 3.0 x 1.5
Weight (g):	19.161
Meteorite Type:	CM2 Chondrite

Macroscopic Description: Kathleen McBride

20% of the exterior has thick, polygonal fractured purple fusion crust. The interior of this carbonaceous chondrite has a black, charcoal-like matrix with an oxidation rind. Tiny white inclusions are present.

Thin Section (,2) Description: Tim McCoy and Valerie Reynolds

The sections consist of a few small chondrules (up to 0.5 mm), mineral grains and CAIs set in a black matrix; rare metal and sulfide grains are present. Olivine compositions are Fa_{0-54}, with a peak at Fa_{0-2}. The matrix consists dominantly of an Fe-rich serpentine. The meteorite is a CM2 chondrite.

Sample No.:	LAP 03922
Location:	LaPaz Ice Field
Field No.:	16471
Dimensions (cm):	3.0 x 2.0 x 1.5
Weight (g):	15.997
Meteorite Type:	H Chondrite (Impact Melt)

Macroscopic Description: Kathleen McBride

Black fusion crust covers 40% of this meteorite's exterior. The interior is rusty with high metal content.

Thin Section (,2) Description: Tim McCoy and Valerie Reynolds

The section consists of highly-shocked clasts of H chondrite (Fa_{19}, Fs_{17}) material in a shock-melted matrix of relict crystals set in a fine-grained igneous matrix with metal-sulfide blebs.

Sample No.:	LAP 03923
Location:	LaPaz Ice Field
Field No.:	16455
Dimensions (cm):	3.0 x 2.5 x 1.5
Weight (g):	20.6
Meteorite Type:	CK5 Chondrite

Macroscopic Description: Kathleen McBride

The exterior is covered with brown/black fusion crust with polygonal fractures. The gray matrix has minor rust and high metal content. A few gray chondrules are visible.

Thin Section (,2) Description: Tim McCoy

The section consists of large (up to 1.5 mm) poorly-defined chondrules in a matrix of finer-grained silicates, sulfides and magnetite. The meteorite is little weathered, but extensively shock blackened. Silicates are homogeneous. Olivine is Fa_{31} and orthopyroxene is Fs_{25}. The meteorite is a CK5 chondrite.

Sample No.:	LAP 03930
Location:	LaPaz Ice Field
Field No.:	16474
Dimensions (cm):	2.0 x 1.9 x 1.0
Weight (g):	8.775
Meteorite Type:	EL3 Chondrite

Macroscopic Description: Cecilia Satterwhite
95% of the exterior has brown/black fusion crust with oxidation halos. The interior is rusty with metal and some dark gray to black areas visible. Weathered mm sized inclusions are visible.

Thin Section (,2) Description: Tim McCoy and Valerie Reynolds
The section shows an aggregate of chondrules (up to 1 mm), chondrule fragments, and pyroxene grains in a matrix of about 30% metal and sulfide. Chondrules contain small amounts of olivine. Weathering is modest, with staining of some enstatite grains and minor alteration of metal and sulfides. Microprobe analyses show pyroxene is $Fs_{0-17,}$ with most grains Fs_{0-2}. Metal contains ~0.6 wt.% Si. The meteorite is a type 3 enstatite chondrite, probably an EL3.

Sample No.:	LAP 031097
Location:	LaPaz Ice Field
Field No.:	16432
Dimensions (cm):	1.25 x 1.0 x 0.75
Weight (g):	2.058
Meteorite Type:	H3 Chondrite

Macroscopic Description: Kathleen McBride
50% of this ordinary chondrite's exterior has brown/black fusion crust with oxidation halos. The interior has a black matrix with rust and mm sized gray chondrules.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
The section exhibits numerous well-defined chondrules (up to 1.5 mm) in a black matrix of fine-grained silicates, metal and troilite. Weak shock effects are present. Polysynthetically twinned pyroxene is extremely abundant. Silicates are unequilibrated; olivines range from Fa_{6-37}, with most grains Fa_{18}, and pyroxenes from Fs_{8-22}. The meteorite is an H3 chondrite (estimated subtype 3.8).

Sample No.:	LAP 031135, LAP 031156
Location:	LaPaz Ice Field
Field No.:	16617; 16357
Dimensions (cm):	1.75 x 1.0 x 0.75; 2.5 x 2.5 x 1.5
Weight (g):	2.727; 14.651
Meteorite Type:	R Chondrite

Macroscopic Description: Kathleen McBride
Exteriors are covered with fractured black fusion crust. The interiors consist of fine grained gray matrix with dark gray inclusions.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
The sections are so similar that single description suffices. The sections consist of ~50% of well-defined, small (up to 1 mm) chondrules set in a slightly recrystallized matrix of silicates and sulfides (both troilite and pentlandite). Olivine is homogeneous (Fa_{39-40}) and pyroxene exhibits a small range (Fs_{21-31}). The meteorites are R chondrites, probably of petrologic type 4.

Sample No.:	LAP 031158
Location:	LaPaz Ice Field
Field No.:	16353
Dimensions (cm):	2.0 x 1.0 x 1.0
Weight (g):	4.413
Meteorite Type:	CK5 Chondrite

Macroscopic Description: Kathleen McBride
95% of the exterior has black fusion crust with polygonal fractures. The interior is a charcoal gray matrix with gray chondrules.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
The section consists of a few large (up to 2 mm) chondrules in a recrystallized matrix of finer-grained silicates, sulfides and magnetite. Shock effects are extensive. Olivine is homogeneous at Fa_{27}. The meteorite is a CK5 chondrite.

Sample No.:	LAP 031173, LAP 04642
Location:	LaPaz Ice Field
Field No.:	16105; 17406
Dimensions (cm):	1.5 x 1.0 x 0.5; 1.0 x 1.0 x 0.5
Weight (g):	1.360; 1.196
Meteorite Type:	H Chondrite (Impact Melt)

Macroscopic Description: Kathleen McBride
The exteriors are covered with brown/black fusion crust with oxidation halos. The interiors are rusty brown with a brittle texture.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
These sections are so similar that a single description suffices. The meteorites exhibit a microcrystalline silicate matrix including rounded metal-sulfide blebs reaching 20 microns and relict grains, chondrules and clasts reaching up to a few mm. Mafic silicate compositions (Fa_{19}, Fs_{17}) indicate they are of H chondrite parentage and textures suggest they are impact melt breccias.

Sample No.:	LAP 031214
Location:	LaPaz Ice Field
Field No.:	16820
Dimensions (cm):	3.0 x 2.0 x 2.0
Weight (g):	9.504
Meteorite Type:	CM 1/2 Chondrite

Macroscopic Description: Kathleen McBride
Thick purple-black fusion crust covers 40% of the exterior. Polygonal fractures are visible. The interior is a dark gray to black matrix with an oxidation rind.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
The sections consist of a few isolated mineral grains in a black matrix; rare metal and sulfide grains are present. Olivine compositions are Fa_{1-41}. The meteorite is a CM chondrite and is intermediate between type 1 and type 2.

Sample No.:	LAP 031280
Location:	LaPaz Ice Field
Field No.:	16046
Dimensions (cm):	4.0 x 2.75 x 1.0
Weight (g):	17.752
Meteorite Type:	Eucrite (Brecciated)

Macroscopic Description: Kathleen McBride
Shiny, rough brown/black fusion crust covers 50% of this achondrite's exterior. The interior is a sandy textured, tan colored matrix with gray inclusions.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
The meteorite is a dominated by a fine-grained (50-100 micron grain size) basaltic host with coarser-grained areas that may be clasts incorporated prior to metamorphism. Pyroxene is exsolved on a 1-20 micron scale. Orthopyroxene analyses range to $Fs_{60}Wo_5$ and augite to $Fs_{32}Wo_{40}$. Plagioclase is $An_{88}Or_{0.5}$. The Fe/Mn ratio of the pyroxene is ~30. The meteorite is a eucrite.

Sample No.:	LAP 031323
Location:	LaPaz Ice Field
Field No.:	16647
Dimensions (cm):	1.5 x 1.5 x 1.0
Weight (g):	3.125
Meteorite Type:	Acapulcoite

Macroscopic Description: Kathleen McBride
50% of the exterior has brown/black fusion crust. The rusty, granular textured interior has a high metal content.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
The section consists of an equigranular mixture of olivine (Fa_{13}), orthopyroxene ($Fs_{12}Wo_2$), clinopyroxene (Fs_5Wo_{43}), plagioclase ($An_{15}Or_4$), metal and troilite. Mafic grain sizes are ~100 microns, triple junctions are common and plagioclase is interstitial to and includes mafic silicates. The rock is an acapulcoite, but similar in texture to the intermediate members of the acapulcoite-lodranite clan EET 84302 and GRA 95209.

Sample No.:	CMS 04016
Location:	Cumulus Ridge
Field No.:	14674
Dimensions (cm):	5.0 x 4.0 x 3.0
Weight (g):	162.069
Meteorite Type:	L3 Chondrite

Macroscopic Description: Kathleen McBride
The exterior and interior of this meteorite is rusty with a high metal content.

Thin Section (,2) Description: Tim McCoy and Valerie Reynolds
The section exhibits numerous well-defined chondrules (up to 1.5 mm) in a black matrix of fine-grained silicates, metal and troilite. Weak shock effects are present. Polysynthetically twinned pyroxene is abundant. The meteorite is moderately weathered. Silicates are unequilibrated; olivines range from $Fa_{1\text{-}26}$, with most grains $Fa_{20\text{-}26}$, and pyroxenes from $Fs_{5\text{-}12}$. The meteorite is an L3 chondrite (estimated subtype 3.8).

Sample No.:	LAP 04840
Location:	LaPaz Ice Field
Field No.:	17198
Dimensions (cm):	5.0 x 3.0 x 1.75
Weight (g):	50.405
Meteorite Type:	R Chondrite

Macroscopic Description: Kathleen McBride
Rough, black fusion crust with polygonal fractures is present on the exterior surface. The interior is a fine grained crystalline matrix with black and white crystalline inclusions. The meteorite was very hard with no rusting or apparent metal.

Thin Section (,4) Description: Tim McCoy
The section is texturally heterogeneous, containing relict chondrules up to 1 mm, isolated mineral grains of 100-200 microns and microcrystalline areas reaching 1 mm with mafic silicate grain sizes of 5-10 microns. Shock effects are pervasive, particularly in plagioclase. The rock consists of FeO-rich olivine (Fa_{38}) and orthopyroxene ($Fs_{30}Wo_1$). Plagioclase is An_7Or_3. A brown, strongly pleochroic mineral comprises ~15% of the section. Microprobe analyses suggest hornblende with approximately 48% SiO_2, 3% Na_2O, 6% Al_2O_3, 16.5% MgO, 11% FeO, 10% CaO and <0.5% TiO_2, MnO and K_2O. Low totals and the strong pleochroism may be due to structurally bound OH, as no Cl was noted in EDS analyses. Opaques include troilite, pentlandite and chromite. The meteorite is an R chondrite of petrologic type 6.
Oxygen isotope analysis laser fluorination: D. Rumble
The analysis of two silicate-rich fractions yielded $\delta^{18}O$ = +4.28, $\delta^{17}O$=+4.37, and $\delta^{18}O$ = +4.76, $\delta^{17}O$=+5.76, similar to other R-chondrites.

Sample No.:	LAP 04843
Location:	LaPaz Ice Field
Field No.:	17006
Dimensions (cm):	5.0 x 5.0 x 2.5
Weight (g):	108.639
Meteorite Type:	CV3 Chondrite

Macroscopic Description: Kathleen McBride
The exterior has rough, black fusion crust with purple shiny areas. Vugs of plucked areas are visible. The muddy gray matrix has white clasts with evaporites. This meteorite was very hard.

Thin Section (,4) Description: Tim McCoy and Linda Welzenbach
The section exhibits large chondrules (up to 3 mm) and CAIs in a dark matrix. Olivines range from $Fa_{1\text{-}46}$ and a single pyroxene is Fs_1. The meteorite is an oxidized CV3.

Sample No.:	LAP 04844
Location:	LaPaz Ice Field
Field No.:	17074
Dimensions (cm):	2.0 x 2.0 x 1.5
Weight (g):	6.831
Meteorite Type:	Diogenite

Macroscopic Description: Kathleen McBride
The exterior has some patchy brown/black fusion crust. The tan to yellowish fine grained matrix has green and brown clasts of various sizes.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
The section shows a groundmass of coarse (up to 1.5 mm) comminuted pyroxene. Orthopyroxene has a composition of $Fs_{23}Wo_2$. The meteorite is a diogenite and is probably paired with the LAP 91900 pairing group.

Sample No.:	MAC 04930	Macroscopic and Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
Location:	MacAlpine Hills	This pea sized rusty ordinary chondrite exhibits numerous small chondrules (up to 1 mm) in a black matrix with irregular metal and troilite. The meteorite is highly weathered. Silicates are unequilibrated; olivines range from Fa_{2-24} and pyroxenes from Fs_{3-12}. The meteorite is an H3 chondrite (estimated subtype 3.6).
Field No.:	15086	
Dimensions (cm):	0.5 x 0.7 x 0.4	
Weight (g):	0.880	
Meteorite Type:	H3 Chondrite	

Sample No.:	MAC 041169	Macroscopic Description: Kathleen McBride
Location:	MacAlpine Hills	40% rough, black fusion crust covers the exterior of this meteorite. The interior is a coarse grained black and white matrix with rusty areas.
Field No.:	15371	
Dimensions (cm):	1.75 x 1.5 x 0.75	
Weight (g):	3.187	Thin Section (, 3) Description: Tim McCoy
Meteorite Type:	Eucrite (Unbrecciated)	The meteorite is a medium-grained (100-200 micron grain size), unbrecciated basalt with numerous late-stage interstitial melt pockets that can reach several hundreds of microns. Mineral compositions are relatively homogeneous with orthopyroxene ($Fs_{57-64}Wo_{2-5}$), with 1-5 micron lamellae of augite ($Fs_{32}Wo_{39}$), and plagioclase ($An_{89}Or_{0.5}$). The Fe/Mn ratio of the pyroxene is ~30. The meteorite is an unbrecciated eucrite.

Sample No.:	MAC 041269	Macroscopic Description: Kathleen McBride
Location:	MacAlpine Hills	50% of the exterior surface is covered with black shiny (like glass) fusion crust. The interior is a black and gray, fine grained matrix with black and white inclusions. Very minor amount of rust is present.
Field No.:	15820	
Dimensions (cm):	2.0 x 1.5 x 1.0	
Weight (g):	4.509	
Meteorite Type:	Howardite	Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
		The section shows a groundmass of comminuted pyroxene and plagioclase (up to 0.5 mm) with fine- to coarse-grained basaltic clasts ranging up to 5 mm. Pyroxene ranges from pigeonite composition (possibly finely exsolved) of $Fs_{56}Wo_{6}$ to augite of $Fs_{28}Wo_{40}$. Plagioclase is $An_{89}Or_{0.5}$. The meteorite is a howardite.

Sample Request Guidelines

Requests for samples are welcomed from research scientists of all countries, regardless of their current state of funding for meteorite studies. Graduate student requests should have a supervising scientist listed to confirm access to facilities for analysis. All sample requests will be reviewed in a timely manner. Sample requests that do not meet the curatorial allocation guidelines will be reviewed by the Meteorite Working Group (MWG). Issuance of samples does not imply a commitment by any agency to fund the proposed research. Requests for financial support must be submitted separately to an appropriate funding agency. As a matter of policy, U.S. Antarctic meteorites are the property of the National Science Foundation, and all allocations are subject to recall.

Samples can be requested from any meteorite that has been made available through announcement in any issue of the ***Antarctic Meteorite Newsletter*** (beginning with 1(1) in June, 1978). Many of the meteorites have also been described in five *Smithsonian Contributions to the Earth Sciences*: Nos. 23, 24, 26, 28, and 30. Tables containing all classified meteorites (as of August 2005) have been published in the Meteoritical Bulletins 76, 79, and 82-90 available in the following volumes and pages of *Meteoritics* and *Meteoritics and Planetary Science*: 29, p. 100-143; 31, A161-A174; 33, A221-A240; 34, A169-A186; 35, A199-A225; 36, A293-A322; 37, A157-A184; 38, A189-A248; 39, A215-A272; 40 A201-263; 41 in press. They are also available online at:

http://www.meteoriticalsociety.org/simple_template.cfm?code=pub_bulletin

The most current listing is found online at:

http://curator.jsc.nasa.gov/curator/antmet/us_clctn.htm

All sample requests should be made electronically using the form at:

http://curator.jsc.nasa.gov/curator/antmet/samreq.htm

The purpose of the sample request form is to obtain all information MWG needs prior to their deliberations to make an informed decision on the request. Please use this form if possible.

The preferred method of request transmittal is via e-mail. Please send requests and attachments to:

cecilia.e.satterwhite1@jsc.nasa.gov

Type **MWG Request** in the e-mail subject line. Please note that the form has signature blocks. The signature blocks should only be used if the form is sent via Fax or mail.

Each request should accurately refer to meteorite samples by their respective identification numbers and should provide detailed scientific justification for proposed research. Specific requirements for samples, such as sizes or weights, particular locations (if applicable) within individual specimens, or special handling or shipping procedures should be explained in each request. Some meteorites are small, of rare type, or are considered special because of unusual properties. Therefore, it is very important that all requests specify both the optimum amount of material needed for the study and the minimum amount of material that can be used. Requests for thin sections that will be used in destructive procedures such as ion probe, laser ablation, etch, or repolishing must be stated explicitly.

Consortium requests should list the members in the consortium. All necessary information should be typed on the electronic form, although informative attachments (reprints of publication that explain rationale, flow diagrams for analyses, etc.) are welcome.

The Meteorite Working Group (MWG), is a peer-review committee which meets twice a year to guide the collection, curation, allocation, and distribution of the U.S. collection of Antarctic meteorites. The deadline for submitting a request is 2 weeks prior to the scheduled meeting.

Requests that are received by the MWG secretary by **March 3, 2006** deadline will be reviewed at the MWG meeting **March 17-18, 2006** in Houston, TX. Requests that are received after the deadline may be delayed for review until MWG meets again in the Fall of 2006. **Please submit your requests on time.** Questions pertaining to sample requests can be directed to the MWG secretary by e-mail, fax or phone.

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Meteorites On-Line

Several meteorite web site are available to provide information on meteorites from Antarctica and elsewhere in the world. Some specialize in information on martian meteorites and on possible life on Mars. Here is a general listing of ones we have found. We have not included sites focused on selling meteorites even though some of them have general information. Please contribute information on other sites so we can update the list.

JSC Curator, Antarctic meteorites	http://www-curator.jsc.nasa.gov/antmet/index.cfm
JSC Curator, martian meteorites	http://www-curator.jsc.nasa.gov/antmet/marsmets/index.cfm
JSC Curator, Mars Meteorite Compendium	http://www-curator.jsc.nasa.gov/antmet/mmc/index.cfm
Antarctic collection	http://geology.cwru.edu/~ansmet/
Smithsonian Institution	http://www.minerals.si.edu/
LPI martian meteorites	http://www.lpi.usra.edu
NIPR Antarctic meteorites	http://www.nipr.ac.jp/
BMNH general meteorites	http://www.nhm.ac.uk/research-curation/departments/mineralogy/research-groups/meteoritics/index.html
UHI planetary science discoveries	http://www.psrd.hawaii.edu/index.html
Meteoritical Society	http://www.meteoriticalsociety.org/
Meteoritics and Planetary Science	http://meteoritics.org/
Meteorite! Magazine	http://homepages.ihug.co.nz/~afs/index.html
Geochemical Society	http://www.geochemsoc.org
Washington Univ. Lunar Meteorite	http://epsc.wustl.edu/admin/resources/moon_meteorites.html
Washington Univ. "meteor-wrong"	http://epsc.wustl.edu/admin/resources/meteorites/meteorwrongs/meteorwrongs.htm

Other Websites of Interest

Mars Exploration	http://mars.jpl.nasa.gov
Rovers	http://marsrovers.jpl.nasa.gov/home/index.html
Near Earth Asteroid Rendezvous	http://near.jhuapl.edu/
Stardust Mission	http://stardust.jpl.nasa.gov
Genesis Mission	http://genesismission.jpl.nasa.gov
ARES	http://ares.jsc.nasa.gov/